Specifications for Community Environmental Air Monitoring During the Abatement and Demolition of 4 Albany Street

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Community Environmental Air Monitoring
During the Abatement and Demolition of the Building at 4 Albany Street

The environmental air monitoring and observations of visible emissions during the abatement and demolition of the building located at 4 Albany Street, New York City, NY (the "Building") will be performed according to methods or their equivalents contained in this specification.

Objective

The objective of environmental (ambient) air monitoring during this Project is to monitor air quality during abatement and demolition of the Building. Air monitoring is to be conducted during two phases of this Project: the Abatement Phase during which selected contaminants will be cleaned to at or below specified levels and tenant fit out and furniture will be removed from the Building and the Demolition Phase during which the remaining core and structure will be removed to street level. Air monitoring will be conducted along the property perimeter and potential emission areas.

Air Monitoring

Air monitoring for this Project will include both observation and air sampling followed by instrument analysis.

Visible emissions

1. Abatement Phase

During each work shift, the Environmental Consultant will be tasked with observing the Building's containment barriers and exterior. Special attention will be paid to established isolation barriers and area(s) of high emission potential to identify any visible emissions.

If any visible emission is noted exterior of the work area, the work will be stopped and an immediate evaluation of in-place engineering controls for the emission location by the Environmental Consultant will take place. The evaluation may include, but is not limited to, work activities and smoke testing of the isolation barriers. Any damaged or malfunctioning engineering control will be repaired immediately. The work will not be restarted until engineering controls are repaired or determined to be functioning properly.

2. Demolition Phase

During each work shift, the Environmental Consultant will observe demolition operations to monitor visible dust in the air and suppression measures being applied by the demolition contractor. The Environmental Consultant may, depending on the severity and duration of dust

condition, order a stoppage of the work or require modified work practices to reduce visible dust.

3. Notification

The EPA Region 2 office and NYCDEP will be notified as promptly as reasonably possible of any visible emissions observed by the Environmental Consultant to cross the property line of the Building, and the Environmental Consultant will subsequently promptly advise the EPA Region 2 office and NYCDEP of the corrective actions taken.

Air Sampling and Analytical Methodology

Analysis and sampling methods used in this Project, will follow EPA or National Institute of Occupational Safety and Health ("NIOSH") protocols as guidelines or other standard methodologies. Modifications to sampling and analysis protocols listed below may be made as required to permit an accurate and precise analysis. Generally, sampling will be performed once each 24-hour hour work period, except for asbestos (TEM samples), which will be taken for the duration of every work shift and once a day during non-work days during the Abatement Phase. Real-time particulate monitoring will be on a continuous basis. Instantaneous mercury readings will be obtained to evaluate the air quality around the work site at multiple locations each work day. The discussion and table below sets forth a more detailed explanation of the sample collection and analysis protocols.

Table of Air Sampling and Methodologies

Analyte	Sampling Method	Sample Rate*	Duration Per Day	Comments
Metals				
Antimony, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury (particulate), Nickel, and Zinc	NIOSH 7300	2 to 4 lpm	24 hrs	MCE Filter, ICP-MS Analysis
Mercury	Ohio Lumex RA915+, Direct Read	20 lpm	Instantane-ously	Elemental (vapor) Mercury Analysis

Analyte	Sampling Method	Sample Rate*	Duration Per Day	Comments
Particulate and Dust				
Asbestos	NIOSH 7402	2-6 1pm	Minimum of 4 hours	Analysis via AHERA mod. methodology
Particulate PM 10	Met One 9012, Real-Time Particle Counter	2.38 lpm	24 hours	Real-time analysis
Particulate PM 2.5	Met One 9012, Real-Time Particle Counter	2.38 lpm	24 hours	Real-time analysis
Total Dust	NIOSH 0500	2 lpm	24 hours	
Respirable Crystalline Silica and Dust	NIOSH 0600/7500	2.5 lpm	24 hours	SKC Aluminum cyclone
WTC Dust (includes vitreous fibers & asbestos)	NIOSH 7402 using polycarbonate filter	2-4 lpm	24 hours	SEM/EDS Analysis of PC filter
Organics (semi-volatiles)				
Dioxin/Furans	EPA TO-9A	0.225 std. m^3/min	24 hours	Quartz fiber and PUF filter
Polychlorinated biphenyls (PCB)	EPA TO-4A	0.225 std. m^3/min	24 hours	Quartz fiber and PUF filter
Polycyclic Aromatic Hydrocarbons (PAH)	EPA TO-13A	0.22 std. m^3/min	24 hours	Quartz fiber and PUF filter

* lpm = liter per minute, sampling rates may be modified to optimize filter sample loading.

Asbestos sample collection will be performed in accordance with NIOSH 7402, "Asbestos by TEM". Asbestos analysis will be performed utilizing Transmission Electron Microscopy ("TEM") analysis specified in 40 CFR Part 763, Asbestos Hazard Emergency Response Act, ("AHERA"), with the following modifications:

1. The sensitivity on TEM air samples will be less than 0.002 s/cc.

2. Both length and width of all asbestos fibers will be recorded.

3. Confirmation by EDS and/or SAED will be performed for each fiber analyzed.

4. The morphology of the fibers will be noted and recorded.

Metals sampling and analysis will be performed following NIOSH 7300 "Elements by ICP" methodology with the following modifications:

1. ICP-MS will be utilized when analyzing metal air sample filters. Rational: ICP-MS has an approximate 100X (times) lower detection limit than standard ICP-AES analysis specified in NIOSH 7300.

2. Metals to be analyzed by ICP-MS and reported are: Antimony, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury (particulate), Nickel and Zinc.

3. A hot block/acid digestion will be used.

In addition to metals monitoring for mercury particulate using air filters, real-time monitoring will be performed. Mercury monitoring will be performed utilizing a Lumex RA 915+ direct read instrument. The readings will be entered into the PDA program for inclusion with the daily download of sample collection data.

The Lumex RA915+ will be utilized to obtain detection levels below established Site air contaminant criteria. At a minimum, mercury readings will be taken twice a shift at the fixed air monitoring locations (seven during the Abatement Phase and three during the Demolition Phase). At the discretion of the Environmental Consultant and as daily Site conditions may dictate, additional mercury readings may be taken.

Airborne dust and particles at the Site will be monitored using real-time air monitoring instrumentation. Real-time air monitoring for PM-2.5 and PM-10 will be accomplished with direct reading particulate in air monitors. Data from Met One 9012 Particle Counters are to be data logged. At one location the Met One 9012 Particle Counter data will be compared against PM-2.5 results from either laboratory analysis of paired sample filters obtained using an appropriate Federal Reference Method or PM-2.5 direct read results obtained using a Met One BAM 1020 monitor or Rupprecht and Papashnick TEOM instrument. At another location, the Met One 9012 Particle Counter data will be compared against PM-10 results from either laboratory analysis of paired sample filters obtained using an appropriate Federal Reference Method or PM-10 direct read results obtained using a Met One BAM 1020 monitor or Rupprecht and Papashnick TEOM instrument. This equipment will be operated for at least two weeks before the Demolition Phase begins. Prior to the commencement of the Demolition Phase, the EPA Region 2 office will be provided with the results of comparing the data from the Met One 9012 with the alternative sample collector or instrument and the proposal of a correction factor, if needed.

Samples for WTC Dust/Particle characterization will be collected in accordance with NIOSH method 7402, "Asbestos by TEM". The analysis of a directly prepared polycarbonate (PC) filter will be performed utilizing Scanning Electron Microscopy (SEM). The SEM will be operated at 250X to

2000X magnification. The SEM analysis will have a limit of detection of 0.0002 f/cc on any fiber greater than 5 µm in length. The fibers analyzed during the SEM analysis will be greater than 5 um in length and have an aspect ratio of at least three to one (length to width ratio) and have a width at or above 0.2 um (i.e., PCMe Fibers). Fibers will be classified based on morphology and elemental composition (i.e., MMVF and asbestos). All fibers are to be photographed (digitally logged) during SEM analysis.

Respirable dust and crystalline silica sampling will be performed according to NIOSH Method 0600 protocol with analysis following NIOSH Method 7500 (XRD).

Abatement Phase Air Monitoring

Air monitoring of airborne asbestos fibers for NYCDEP ACP 7 filing Outside the Work Area (OSWA) is included in this phase of the work. NYCDEP regulations only require PCM sampling and analysis for asbestos samples. This specification is more stringent and requires samples to be analyzed using TEM. Worksite asbestos sampling locations include:

1. Porous Material Waste Decon Clean Room.
2. Non-Porous Material Waste Decon Clean Room.
3. Personnel Decon Clean Room.
4. Shanty (location may change daily).
5. Lobby.
6. One HEPA Exhaust Location (location may change daily).
7. In any occupied areas that are adjacent to an isolation barrier.

Additional community air monitoring locations will consist of five Building exterior asbestos sampling locations which will be placed on the street level and two roof level locations for a total of seven sampling locations exterior to the Building.

The following sample locations, along with two blanks (asbestos) and one blank (metals) will be sampled daily as part of the NYCDEP requirements included in community OSWA monitoring program. The community monitoring program will be performed at the seven (7) locations each work day (except for asbestos sampling which will be conducted on each work day). Four (4) types of samples (see following table) will be collected and submitted for analysis from each community monitoring location. The seven (7) community air monitoring locations to be sampled during the Abatement Phase are:

1. West end of the North side of the Building, Albany Street sidewalk.
2. East end of the North side of the Building, Albany Street sidewalk.
3. West side of the Building, Washington Street side walk.
4. West end of the South side of the Building, Carlisle Street sidewalk.
5. East end of the South side of the Building, Carlisle Street sidewalk.
6. Roof, center.*
7. Roof, southern half east parapet, adjacent to the 120 Greenwich water-tower.*

*These locations are subject to relocation based on Abatement Phase activities on the roof.

Parameters to be sampled and analyzed from each OSWA location are: Asbestos (TEM), WTC Dust Characterization (SEM/EDS), Metals (ICP-MS) and crystalline silica (XRD).

A summary of Abatement Phase sampling and analysis plan is contained in the following table:

Abatement Phase Sampling and Analysis Summary, 4 Albany Street

Location	**Parameter(s)**	**Sample Frequency**	**Analysis Method**	**Comment**
Site Area	Mercury	Each Work Day	Lumex, portable mercury analyzer	Lumex results are data logged
Site Area	Visible dust emissions	Each Work Day	Visual observation	
West end of the north sidewalk	1. Asbestos 2. WTC Dust 3. Silica 4. Metals	Each Work Day, asbestos is sampled each work shift	1. TEM 2. SEM 3. XRD 4. ICP/MS	Sampling duration/flow rate may be modified.
East end of the north side sidewalk	1. Asbestos 2. WTC Dust 3. Silica 4. Metals	Each Work Day, asbestos is sampled each work shift	1. TEM 2. SEM 3. XRD 4. ICP/MS	Sampling duration/flow rate may be modified.
West side on the Washington Street sidewalk	1. Asbestos 2. WTC Dust 3. Silica 4. Metals	Each Work Day, asbestos is sampled each work shift on	1. TEM 2. SEM 3. XRD 4. ICP/MS	Sampling duration/flow rate may be modified.

Location	Parameter(s)	Sample Frequency	Analysis Method	Comment
		work days and once a day on non-work days		
West end of the Carlisle Street sidewalk	1. Asbestos 2. WTC Dust 3. Silica 4. Metals	Each Work Day, asbestos is sampled each work shift	1. TEM 2. SEM 3. XRD 4. ICP/MS	Sampling duration may be modified.
East end of the Carlisle Street sidewalk.	1. Asbestos 2. WTC Dust 3. Silica 4. Metals	Each Work Day, asbestos is sampled each work shift	1. TEM 2. SEM 3. XRD 4. ICP/MS	Sampling duration may be modified.
Roof , center	1. Asbestos 2. WTC Dust 3. Silica 4. Metals	Each Work Day, asbestos is sampled each work shift	1. TEM 2. SEM 3. XRD 4. ICP/MS	Sampling duration may be modified.
Roof, east parapet near 120 Greenwich Street water tower	1. Asbestos 2. WTC Dust 3. Silica 4. Metals	Each Work Day, asbestos is sampled each work shift	1. TEM 2. SEM 3. XRD 4. ICP/MS	Sampling duration may be modified.
Waste Decon Clean Room, porous material (when operational)	Asbestos	One sample per shift worked and once on non-work days	TEM	
Waste Decon Clean Room, non-porous material (when operational)	Asbestos	One sample per shift worked and once on non-work days	TEM	
Personnel Decon Clean Room Carlisle Street (when operational)	Asbestos	One sample per shift worked and once on non-work days	TEM	
Shanty (Rotating daily)	Asbestos	One sample per shift worked and once on non-work days	TEM	
One HEPA Exhaust Location	Asbestos	One sample per shift worked and once on non-work days	TEM	

Location	Parameter(s)	Sample Frequency	Analysis Method	Comment
Lobby	Asbestos	One sample per shift worked and once on non-work days	TEM	
Personnel Decon Clean Room Albany Street (when operational)	Asbestos	One sample per shift worked and once on non-work days	TEM	
Blanks	1. Asbestos 2. WTC Dust 3. Silica 4. Metals	2 blanks per day 1 blank per day 1 blank per day 1 blank per day	1. TEM 2. SEM 3. XRD 4. ICP/MS	

Roof sampling locations will continue until the final clearance is reached for the Abatement Phase. Once roof abatement begins these sampling locations will be moved to various locations on the roof to accommodate abatement activities and will continue to provide community air monitoring.

Demolition Phase Air Monitoring

During the Demolition Phase the community air monitoring program will be performed at three (3) locations each work day. During each work day, three (3) samples will be collected and submitted for analysis from each community monitoring location. The three (3) community monitoring locations to be sampled during the Demolition Phase are:

1. North side of the Building on the Albany Street sidewalk.

2. West side of the Building on the Washington Street sidewalk.

3. West end of the Carlisle Street sidewalk.

During the first three days of the Demolition Phase, community air sampling and analysis will include organic compounds. Samples for organic compound analyses will be analyzed within fourteen days under normal laboratory analysis turn-around time. After the first three days of the Demolition Phase, organic samples will be collected at each location once a week on a different day of the work week, until all days of the work week are used and then the same schedule will be repeated until Project completion.

The organic samples collected during this once a week protocol will be stored and not processed for analysis, except that one sample for each of the three organics will be processed for analysis from the location with the highest particulate readings during the date the samples are collected.

Except as noted above for organics, parameters to be sampled and analyzed from each Demolition Phase location are: Asbestos (TEM), WTC Dust Characterization (SEM), Silica, Metals (ICP-MS) and total dust. One metals and two asbestos blanks will be collected daily. A summary of Demolition Phase sampling and analysis is contained in the following table.

Demolition Phase Sampling and Analysis Summary, 4 Albany Street

Location	Parameter(s)	Sample Frequency	Method	Comment
Site Area	Mercury	Each Work Day	Lumex, portable mercury analyzer	Lumex results are real-time data logged
Site Area	Particulate (Visible dust emissions)	Each Work Day	Visual observation	
Site Perimeter - three fixed locations	Particulate PM-2.5, PM-10	Daily	Laser dispersion Real-time analysis, Met One 9012	
Site Perimeter – one fixed location	Particulate PM-2.5, PM-10	Each Work Day	FRM filter analysis (gravimetric) or Met One BAM 1020 or TEOM 1400A	Comparison data for Met One 9012
Waste load-out area on the North side the Building	1. Asbestos 2. WTC Dust 3. Silica 4. Metals 5. Total dust[1] 6. Organics[3]	Each Work Day	1. TEM 2. SEM 3. XRD 4. ICP/MS 5. Microbalance 6. PCB (EPA TO-7A) Dioxin (EPA T0-9A (mod)) and PAH (EPA TO-13A)	Sampling duration may be modified[2]

Location	Parameter(s)	Sample Frequency	Method	Comment
West side on the Washington Street sidewalk.	1. Asbestos 2. WTC Dust 3. Silica 4. Metals 5. Total dust[1] 6. Organics[3]	Each Work Day	1. TEM 2. SEM 3. XRD 4. ICP/MS 5. Microbalance 6. PCB (EPA TO-7A) Dioxin (EPA T0-9A (mod)) and PAH (EPA TO-13A)	Sampling duration may be modified[2]
West end of the Carlisle Street sidewalk.	1. Asbestos 2. WTC Dust 3. Silica 4. Metals 5. Total dust[1] 6. Organics[3]	Each Work Day	1. TEM 2. SEM 3. XRD 4. ICP/MS 5. Microbalance 6. PCB (EPA TO-7A) Dioxin (EPA T0-9A (mod)) and PAH (EPA TO-13A)	Sampling duration may be modified[2]
Blanks	1 Asbestos 1 WTC Dust 1 Silica 1 Metals 1 Total dust[1]	Each Work Day	1. TEM 2. SEM 3. XRD 4. ICP/MS 5. Microbalance	

[1]Total dust as determined using NIOSH 0500 methodology.

[2]Sampling duration and/or flow rate may be modified to provide optimum analyte loading for analysis based on results of ongoing analysis. Initial sampling flow rates will be according to rates prescribed in the sampling method.

[3]Organics will be sampled as provided in the previous text.

Evaluating Results

The Target Air Quality Levels and EPA Site Specific Trigger Levels for the Site are set forth below:

Analyte	Target Air Quality Levels	EPA Site Specific Trigger Levels
Metals		
Antimony	5 ug/m^3	14 ug/m^3
Barium	5 ug/m^3	5 ug/m^3
Beryllium	0.02 ug/m^3	0.2 ug/m^3
Cadmium	0.04 ug/m^3	2 ug/m^3
Chromium	0.6 ug/m^3	60 ug/m^3
Chromium VI		0.6 ug/m^3
Copper	10 ug/m^3	100 ug/m^3
Lead	1.5 ug/m^3	5 ug/m^3
Manganese	0.5 ug/m^3	0.5 ug/m^3
Mercury	0.3 ug/m^3	3 ug/m^3
Nickel	0.2 ug/m^3	28 ug/m^3
Zinc	16 ug/m^3	160 ug/m^3
Particles and Dusts		
Asbestos	0.00028 f/cc (SEM PCMe fibers)	70 S/mm^2 (TEM AHERA structures)[1]
Particulate PM-10 (24 hour average)	150 ug/m^3	150 ug/m^3
Particulate PM-2.5 (24 hour average)	40 ug/m^3	65 ug/m^3
Respirable Silica (crystalline)	10 ug/m^3	10 ug/m^3
Organics (semi-volatiles)		
Dioxins/Furans (2,3,7,8 – TCDD equiv.)	0.00025 ng/m^3	0.025 ng/m^3
PCB (total Aroclors)	0.12 ug/m^3	12 ug/m^3
PAH (benzo-a-pyrene equivalent)	0.034 ug/m^3	3.4 ug/m^3

[1]Evaluation of samples using TEM AHERA is pursuant to requirements of NYC DEP and NYS DOL. Minimum air sample volume is 1200 liters.

The following actions will be taken if there is an exceedance of Target Air Quality Level. If there is an exceedance of both the Target Air Quality Level and the EPA Site Specific Trigger Level, actions under the EPA Site Specific Trigger Level heading below will govern.

Target Air Quality Levels

1. Any 24-hour $PM_{2.5}$ and PM_{10} value in excess of the Target Air Quality Level will be considered an "exceedance" and the actions described below will be taken.

2. Any sample of an analyte, other than $PM_{2.5}$ and $PM_{10,}$ in excess of 3 times the Target Air Quality Level for that analyte will be considered an exceedance and the actions described below will be taken.

3. Following the first week of sampling, a "rolling average" will be established based initially on the first week's results, to which will be added daily values as results are received from the laboratory. A rolling average value for any analyte in excess of the relevant Target Air Quality Level will be considered an exceedance of Target Air Quality Level and the actions described below will be taken.

Exceedance of an established Target Air Quality Level for any analyte calculated as provided above will result in an evaluation of engineering controls and work techniques in the source area. This evaluation shall include but not be limited to the evaluation of work activities that may be causing the exceedance, smoke testing of the isolation barriers in question, and inspection and repair of any faulty isolation barriers.

EPA Site Specific Trigger Levels

Any 24-hour value (work shift value on work days or four hour value on non-work days in the case of asbestos) in excess of the EPA Site Specific Trigger Level will be considered an "exceedance" and the actions described below will be taken.

Exceedances of EPA Site Specific Trigger Levels will result in a stoppage of work associated with the exceedance until an evaluation of emission controls is performed and corrective action is in place. The EPA Site Specific Trigger Levels are applicable to individual sample result. If any of the individual sample results exceed an EPA Site Specific Trigger Level, then notification must be made to the USEPA Region 2 office and the NYCDEP. Work will be reinitiated once the USEPA Region 2 office has agreed (and NYC DEP during the Abatement Phase in the case of asbestos exceedances) to the corrective action(s) proposed to prevent the potential for exceedances in future work and such corrective actions have been implemented.

Notification

The US EPA Region 2 office and the NYCDEP will be notified as promptly as reasonably possible of any exceedance of either a Target Air Quality Level or an EPA Site Specific Trigger Level and will be notified promptly of any corrective actions taken in connection with a Target Air Quality Level exceedance and the implementation of corrective actions in connection with an EPA Site Specific Trigger Level exceedance.

Monitoring Data

All sampling results collected pursuant to this specification, in suitable electronic form, will be promptly provided to the USEPA Region 2 office weekly and exceedances will be reported as provided above.